

Please amend the above-identified patent application, without prejudice, as follows:

IN THE CLAIMS:

Replace the claims of record with the following:

1. (previously amended) Method for information storage and data processing comprising the step of thermo-inducing or photo-inducing double-bond shifts in substituted [4n]-annulenes which are substituted by at least one group comprising an extended conjugated π -electron system which is in conjugation with the π -electron system of the [4n]-annulene core, thus generating transitions between two different conjugation states with at least one substituent, resulting in different UV/VIS spectra of the double-bond shifted isomers of [4n]-annulene, which provides the possibility to use distinct conjugation states (conjugation on-state and conjugation off-state) for information storage and data processing, whereby a carrier system is present that allows the modulation of a multitude of the corresponding [4n]-annulene molecules for the permanent or erasable storage of their corresponding conjugative states.

Cont.

2. (original) Method according to claim 1, whereby the two different conjugation states are the conjugation on-state and conjugation off-state of the annulene core π -electrons relative to the substituent π -electrons.

3. (original) Method according to claim 1, whereby said [4n]-annulenes are bicyclic [4n]-annulenes.

4. (original) Method according to claim 3, whereby said bicyclic [4n]-annulenes are heptalenes.

5. (original) Method according to claim 1, whereby the [4n]-annulenes are substituted in 1,2- or 1,4-position relative to each other by two groups having an extended and conjugated π -electron system.

6. (original) Method according to claim 1, whereby a multitude of [4n]-annulene molecules are arranged in a 1-dimensional or in a 2-dimensional or in a 3-dimensional way and wherein said conjugation states are spatially non-uniformly modulated.

7 and 8 (cancel)

9. (currently amended) Method according to claim 81, wherein the matrix comprises a low-melting glass or polycarbonates, polyacetates, methacrylates, styrenes and copolymers thereof, as well as copolymers with polymerisable [4n]-annulenes.

10. (original) Method according to claim 6, whereby a holographic grating is generated by modulating said conjugation states.

11. (original) Method according to claim 6, wherein the spatially non-uniformly modulated conjugation states are generated by a low-energy laser that provides for a local heating so bring the [4n]-annulenes into switching condition and whereby the laser light causes locally, if required, the switch from the conjugative on-state to the conjugative off-state.

12. (original) Method according to claim 6, comprising further to said step of modulating a multitude of [4n]-annulene molecules in a 1-dimensional or 2-dimensional or 3-dimensional way and wherein said conjugation states are spatially non-uniformly modulated, a further step wherein at least one of the optical, electrical or magnetic properties being attributable to said switchable conjugation states is determined and processed.

13. (original) Method according to claim 1, wherein said conjugation states are determined by an optical read-out step.

14. (original) Method according to claim 1, wherein the determination of the spatially non-uniformly modulated conjugation states is used for the optical reading of information.

15. (original) Method according to claim 1, wherein the determination of the spatially non-uniformly modulated conjugation states is used for optical switching and computing.

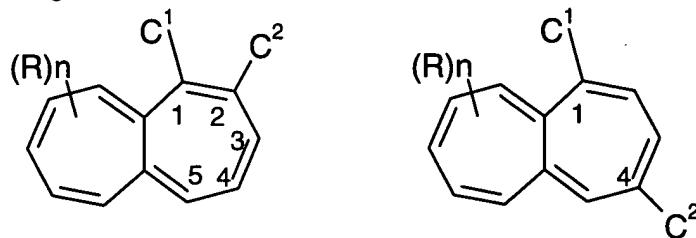
16. (previously canceled)

17. (previously amended) [4n]-heptalenes according to claim 26, whereby, C¹ and C² represent independently from each other a hydrogen atom, a methyl group, a phenyl group, an ethyl ester group, a methyl ester group, a (E)-PhCH=CH-group, a (E)-4-MeOC₆H₄CH=CH-group, a (E)-4-CIC₆H₄CH=CH-group, a 4-MeOC₆H₄-group, a -CH=CH-CH=CH-C₆H₅ group, a -CH=CH-C₆H₄NO₂-4 group, a -CH=CH-C₆H₄OMe-4 group, with the proviso that a heptalene being substituted by a methyl ester group at the position 1, a -CH=CH-CH=CH-C₆H₅ group at the

positions 2 and 5, an isopropyl group at the position 7 and a methyl group at the position 10 is excluded.

18. (previously amended) [4n]-heptalenes according to claim 26, whereby said further substituents R are selected from the group comprising substituted or unsubstituted C₁-C₁₂-alkyl groups or photoactive diazo-containing groups.

19. (previously amended) Method for the preparation of substituted heptalenes of the formula (I) or (II), according to claim 26



(I)

(II)

whereby C¹, C², R and n are as above defined,

comprising the steps of

(a) obtaining a heptalene-dicarboxylate by a reaction of a correspondingly substituted azulene with acetylenedicarboxylate, and optionally

(b) transforming at least one carboxylic group or another substituent that was entered by the preliminary Diels-Alder reaction into the desired conjugated substituent having an extended π -electron system.

20. (original) Method according to claim 19, whereby a heptalene-4,5-dicarboxylate carrying a methyl substituent at the position 1 of the heptalene ring is obtained.

21. (original) Method according to claim 19, further comprising a step (c) wherein at least one of the carboxolate groups within the heptalene ring is replaced by a conjugated substituent containing an extended π -electron system.

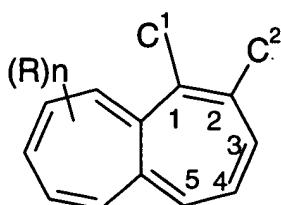
22. (original) Method according to claim 21, wherein the carboxylate group at the position 4 of the heptalene ring is replaced by a conjugated substituent containing an extended π -electron system.

23. (previously amended) An optical storage device comprising at least one substituted [4n]-annulene according to claim 26.

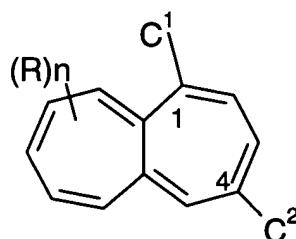
24. (previously amended) A non-linear optical device comprising at least one substituted [4n]-annulene according to claim 26.

25. (currently amended) Process of information storage and data processing by using substituted [4n]-annulenes which are substituted by at least one group comprising an extended conjugated π -electron system which is in conjugation with the π -electron system of the [4n]-annulene core undergoing thermally induced or photo-induced double-bond shifts thus generating or processing previously generated at least two different conjugation states with at least one substituent in selected regions of storage medium whereby a carrier system is present that allows the modulation of a multitude of the corresponding [4n]-annulene molecules for the permanent or erasable storage of their corresponding conjugative state.

26. (previously added) Substituted [4n]-heptalenes of the general formula (I) or (II) being optically and/or thermally switchable, based on thermal or photochemical double-bond shifts (DBS).



(1)



(11)

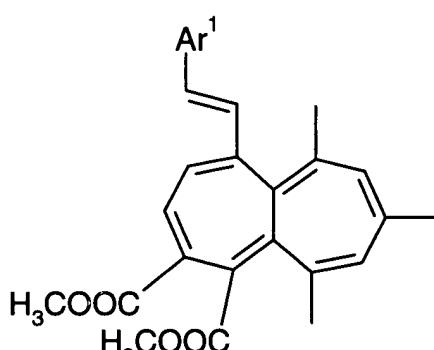
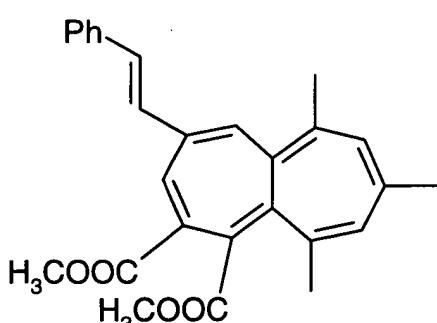
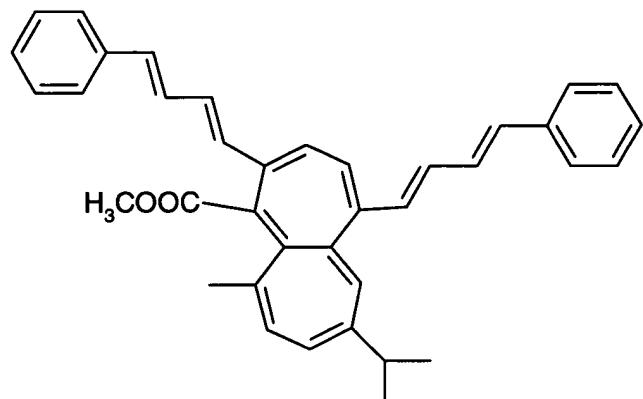
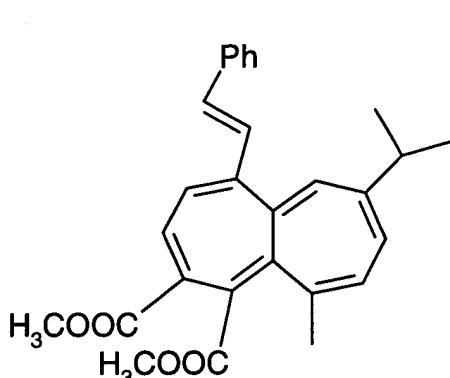
whereby C¹ and C² represent independently from each other a hydrogen atom, a substituted or unsubstituted C₁-C₁₂-alkyl group, a substituted or unsubstituted C₁-C₁₂-alkoxy group, a substituted or unsubstituted aryl-C₁-C₁₂-alkyl group, a substituted or unsubstituted C₁-C₁₂-alkenyl group, a substituted or unsubstituted C₁-C₁₂-conjugated alkenyl group, a substituted or unsubstituted C₁-C₁₂-alkinyl group, a substituted or an unsubstituted phenyl group, a substituted or an unsubstituted heterocyclic group, a cyano group, a nitro group, a thiocyanate group, a C₁-C₁₂-ester group being optionally polymerisable with copolymers, with the proviso

that at least one of said substituents C¹ and C² contains an extended conjugated π -electron system which is in conjugation with the π -electron system of the heptalene core, and

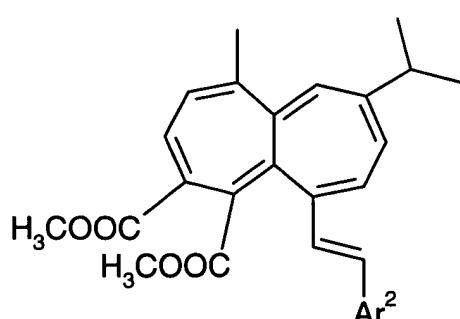
whereby said [4n]-heptalenes can comprise at least one further substituent R being selected from the above indicated groups with n being 0-8,

provided that if one of the at least one further substituents R is an isopropyl group at the position 9 of the heptalene ring, the substituent at the position 6 must not be a methyl group, and

with the proviso that heptalenes having the following substituents including their valence isomers are excluded:



wherein Ar¹ is phenyl, 4-chloro phenyl or 4-methoxy phenyl, and



,wherein Ar² is phenyl or 4-methoxy phenyl.

27. (previously amended) Substituted [4n]-annulenes according to claim 26, wherein at least one of the groups C¹, C² or R is a group -COO-(CH₂)_nOH, a group -COO-(CH₂)_nOOC-C(CH₃)=CH₂ or a group -COO-(CH₂)_nC₆H₄-4-CH=CH₂ wherein n ≥ 2.

Cont.